

Properties of Slow Mode Shocks in the Distant Geomagnetic Tail

C. M. Ho, B. T. Tsurutani and E. J. Smith (All at: Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA 91 109; Tel. 818-354-7894) W. C. Feldman (Los Alamos National Laboratory, Los Alamos, NM 87545)

The two distant ISEE-3 geomagnetic tail passes have been examined to identify all slow mode shocks in the data. We find a total of 83 events from this database using five strict criteria based on magnetic field geometry and plasma relations between the upstream lobe and the downstream plasma-sheet. The statistical results of slow mode shock dependence on various shock parameters such as θ_{Bn} , M_{An} , β_c and B_n will be shown. We have also sought large wavetrains downstream of slow shocks theoretically predicted by Coroniti (1971) and simulation studies. No such wavetrains are observed through these two passes of the distant tail. However, we do see some small amplitude waves appearing in the shock gradient regions. They have frequencies and polarization similar to the plasma-sheet boundary layer waves reported by Tsurutani et al. (1985). Thus, they are probably also right-hand resonant ion cyclotron waves. The substorm dependence of slow mode shocks and plasma-sheet crossing have also been investigated. We find that there is no dependence for the slow mode shock occurrences, but there is a strong dependence for the plasma-sheet crossing occurrences (tail flapping).

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3. (a) C. M. Ho
JP1 /NASA
MS 169-506
4800 Oak Grove Dr.
Pasadena, CA 91109-8099
(b) Tel: (81 8) 354-7894
(c) Fax: (818) 354-8895
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